HDV R 14

Diving vehicle

INSTRUCTION MANUAL
and
WARNINGS FOR USE

05/2010

Welcome to the world of HALCYON

HALCYON congratulates and thanks you for your trust in purchasing our vehicle. Every "underwater scooter" is the result of extensive experience and prolonged prototype testing. A capable and creative staff, assisted by highly courageous diving experts with proven professional and recreational abilities, have created this and other underwater vehicles to assist and extend your underwater dives.
However, never overestimate your abilities and always take specific underwater diving courses to be able to use your underwater vehicle in total safety.

Always remember that fun should NEVER put your life at risk.

The HALCYON staff

WARNING !

PLEASE READ THE FOLLOWING

THIS MANUAL CONTAINS IMPORTANT PRECAUTIONS, WARNINGS AND INFORMATION. IT IS IMPORTANT THAT IT IS CAREFULLY AND FULLY READ BEFORE USING THE UNDERWATER SCOOTER!

Observance of the instructions contained in this manual will allow you to carry out use, transport and maintenance operations safely, while guaranteeing optimal vehicle operation and reduced running costs. The company Halcyon is not liable for damage resulting from negligence on behalf of the user or from failure to observe these instructions**.**

The Distributor HALCYON , declares that:

- the *Halcyon diving vehicle (henceforth called "**HDV**")* shall be delivered to the buyer in perfect working condition, complete with its use and maintenance manual;
- any person attempting to use the *diving vehicle* shall be deemed to have undergone specific training in the use of similar diving vehicles and to have obtained the necessary certification issued by a qualified agency;
- any person attempting to use the *diving vehicle* shall be deemed to have read the use and maintenance manual provided, and hence the instructions contained within, in particular:
  - how to use the *diving vehicle*, with details regarding the diver's correct equipment configuration, the diver's posture during use, the position that must be maintained by the *diving vehicle* during the dive, and that the *vehicle* must not be bound with systems hard to release to its user in any way whatsoever.
  - the environmental conditions where use of the diving vehicle is especially dangerous, such as deep-water dives, obstructed environments, muddy or suspension-filled environments; the special precautions to be adopted when dives are effected in such environments and the need of having undergone suitable training held by qualified agencies;
  - dangerous behaviour that is to be avoided such as, for example, use of the diving vehicle to accelerate the descent or ascent rate;
- it is therefore assumed that the user has been fully informed on how to use and maintain the product as well as of its technical characteristics, and that he shall scrupulously abide by these rules.
- It hence follows that any damage to persons or objects, deriving from incorrect maintenance of the diving vehicle or from its use other than as stipulated by this manual or without the precautions described within, cannot be attributed to defects of the product.

The company Halcyon is not liable for losses or damages suffered by third persons consequent to the use of this *diving vehicle*.

The HDV **is not a toy, nor a suitable rescue means.** It's exclusive function is to **help** expert divers in immersions to cover greater distances than could be normally covered with fins only. The HDV and its components, specifically the battery and battery charger, are intended for adult and expert use after carefully reading these instructions.

In order to prevent any harm to things or individuals, the user of the battery and battery charger supplied with our diving vehicles must first read the use and maintenance manual and strictly observe the indications on correct use and product features, **preventing inexpert personnel or minors from handling, even inadvertently, the HDV and supplied instruments.**
Our HDV are equipped with a “cut off” device that protects internal components, impeding operations when voltage is too low. **When this device is triggered, it inevitably, shuts off.**
This feature must always be kept in mind to avoid any hazards for the diver who, when planning a dive, will leave sufficient time to **surface even without HDV power** should the battery, due to the amount of time under water, die.
HALCYON is not liable for any damages to persons and/or property caused by use other than that described in this manual and in neglect of the precautions described herein.
Due to constant technological developments, HALCYON diving vehicles may be modified at any time without prior notice.

This manual is not a substitute manual for an adequate course held by certified agencies on the correct use of HDV on dives.

Use of the HDV under the influence of alcohol and drugs and in any situation in which psycho-physical conditions are not suited for diving is prohibited.

Contents

1 General safety and accident prevention regulations

Pay special attention to the hazard signs in this manual. There are 3 levels of hazard signs:



This sign is a warning that failure of the user to adhere to the described operations will expose him to health hazards that may lead to serious or permanent harm.



This sign is a warning that failure of the user to adhere to the described operations will expose him to possible health hazards that shall not, however, lead to serious or permanent harm.



This sign is a warning that failure of the user to adhere to the described operations may lead to damage of the vehicle.

Please read the instructions in this manual carefully, before using the vehicle.
Copyrights for this manual belong exclusively to the company HALCYON Reproduction of this document, in part or in whole, is forbidden unless prior consent is obtained in writing.

IMPORTANT NOTE!

Although diving with the HDV is great fun and relieves you of substantial effort, do not ever forget that it is a machine and …

IT CAN BREAK!

Never consider the HDV to be an aid in dangerous situations.

IT IS NOT A LIFE-SAVING DEVICE!

Always remember that you can ONLY COUNT ON YOUR OWN STRENGTH.

2 Description and operating principle

The HDV consists of a perfectly watertight, streamlined, hollow body, see figure 1, inside which the electric motor, rechargeable batteries and speed-reduction gear are housed. On the outside, two manoeuvring handles (1) are found at the rear, one of which has an integrated trigger (2) to control propeller rotation by means of a lever (3). At the front, a handle (4) is used for gripping and carrying the vehicle. The propeller (10) is located at the rear end and is protected by a surrounding circular strip which constitutes the flow conveyor (5). The main switch (6) used to select one of the two speeds (7), is also found at the rear.
In front is situated the head cap (8). By opening it we can access to the battery compartment, the locking wheel (9) is inserted in the shell.

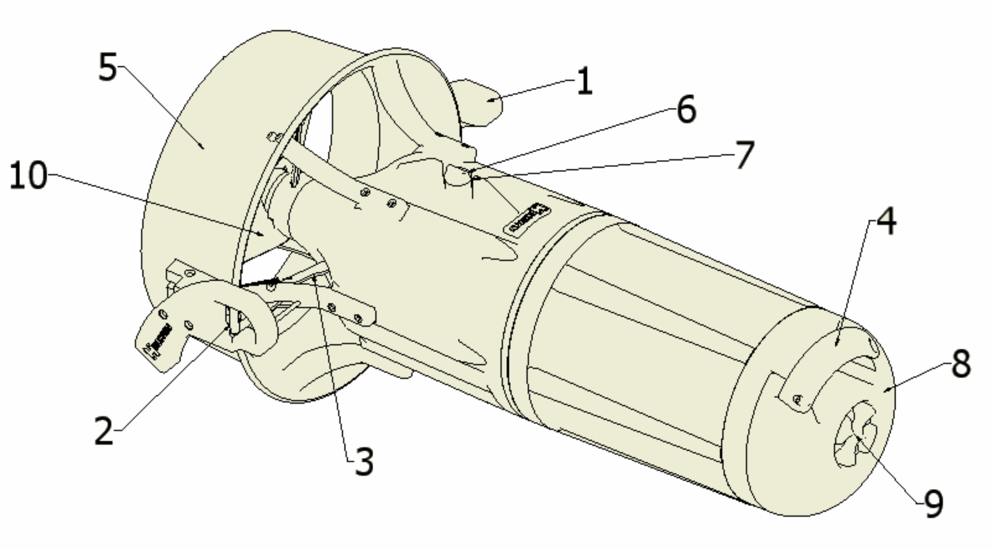


Figure 1

3 Using the vehicle

The *diving vehicle* distibuited by HALCYON is a vehicle that has been designed and constructed for dive transportation purposes. Customers and third parties are forbidden from carrying out any alterations that may substantially modify its intended purpose.



The vehicle has been designed, sized and constructed for the sole purpose described above. Any other use or operation that does not comply or agree with the instructions contained in this manual, may result in damage to the vehicle. This would prevent the conditions for which it has been designed and built from being achieved, and may compromise its technical and safety characteristics. The manufacturer shall not be liable for damage to persons and/or objects deriving from inappropriate use of the vehicle.

4 Preliminary operations

Make sure the following parts are in the box:
A HDV R 14 model
A battery
A battery charger
A salt water ballast
This instruction manual

4.1 Opening the battery compartment

Stand the HDV upright on a flat surface resting it on the flow conveyor (5).
Turn the front hand wheel (9) counter-clockwise. Rotating the hand wheel, the shell (8) (see fig. 1) start to lift. Continue rotating until the shell detaches from the engine body. Remove the shell.
Note: always rinse, accurately clean and dry the HDV before opening it. Sand or mud can enter the OR housing (19) (see fig. 6) and jeopardize the perfect hermetic seal.

4.2 Extracting the battery

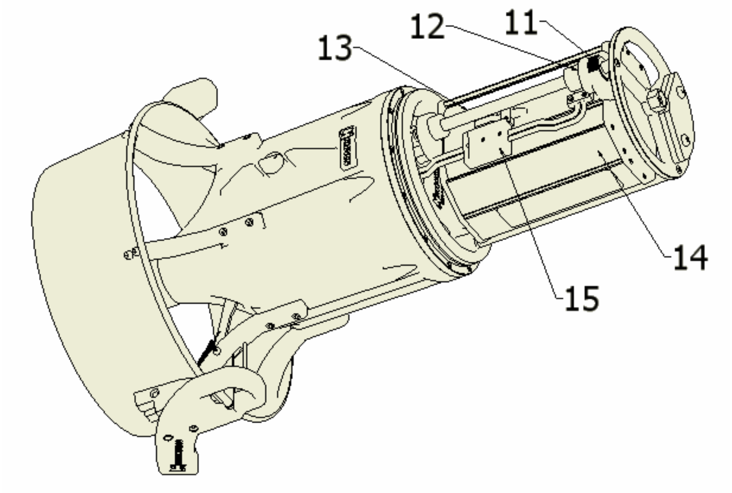


Figure 2

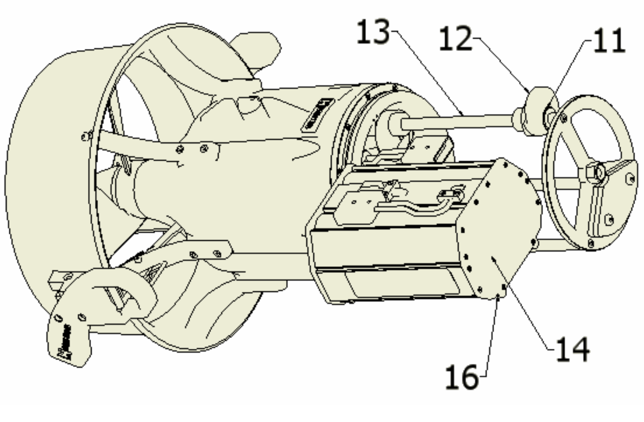


Figure 3

After removing the shell, stand the HDV vertically, detach the red connector (15) (do not pull the wires), unscrew the ring nut (11), remove the terminal (12) (see fig. 2) and extract the battery (14) pulling it upwards off the rod (13). (see fig. 3)

4.3 Recharging the battery

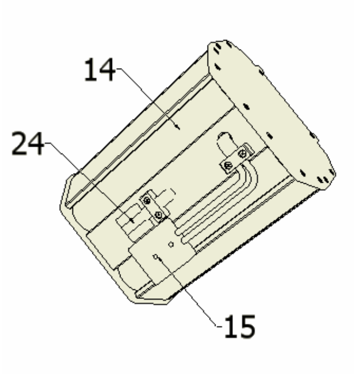


Figure 4

To recharge the battery, put it in a safe place away from people and flammable objects. connect the charge connector (24) to the battery charger (see battery charger instructions). Next connect the battery charger power cord to the mains. When charged, disconnect the battery charge.
WARNING: do not use the battery charger with the power cord damaged or broken. Electrical shock hazard with even fatal consequences.

4.4 Inserting the battery

With the HDV in vertical position, repeat the battery extraction procedure in reverse order, being careful to insert the rear stops (16) between the battery support rods (see fig. 3).
After inserting the battery, connect the terminal (12) and tighten without forcing the ring nut (11) (see fig. 5) being careful to only connect the red connector (15) if the HDV is immediately used.

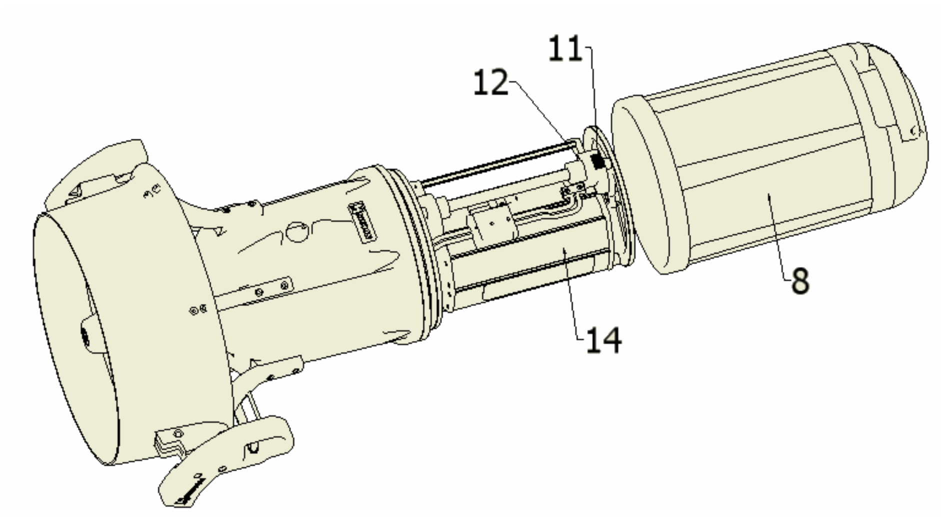


Figure 5

4.5 Closing the battery compartment

Stand the propeller protection on a level surface. Carefully check that the lock O-ring (19), (see fig. 6) is properly seated and that it is clean and suitably greased with silicone oil (the one commonly used for underwater gear). Check that the rim of the body (20), is clean, and if necessary pass a clean cloth to remove any dust or sand. Insert the front shell (8) matching the screw (18) up with the hole (17). Turn the wheel (9) clockwise until it closes completely and tighten using only two fingers.

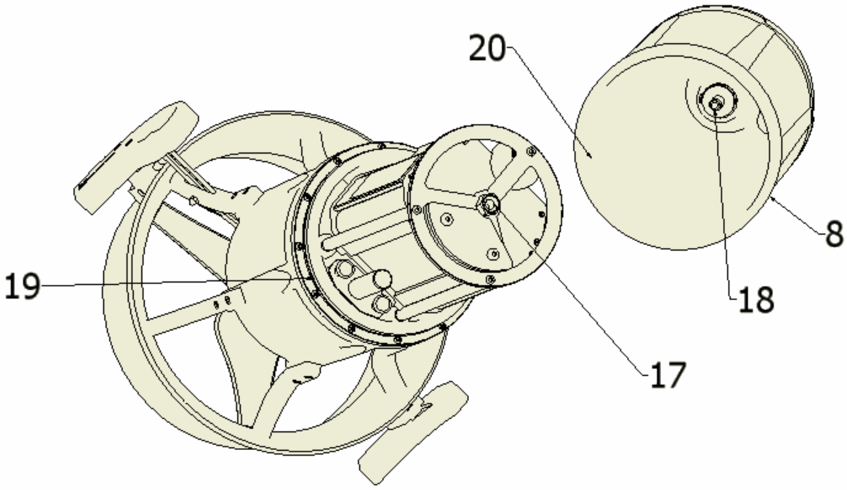


Figure 6

5 Correct use

Check the preliminary operations (scooter complete with gaskets and perfectly closed). Proceed as follows to start the HDV:
Always make sure the switch (6) is in the off position, submerge the HDV under water and make sure nothing is caught between the propeller blades. If something is found between the propeller blades, remove the HDV from the water and free the propeller blades of the foreign object. **Be extremely carefully since using hands or other parts of the body between the propeller blades is potentially hazardous, even if a safety clutch is installed between the propeller and engine. For this reason, avoid introducing your hands in the propeller area and, if necessary for cleaning purposes or to remove foreign objects, use or stick or other suitable tool.**
Turn the switch (6) (see fig. 1) to the required speed. The on light, blue led, (25)(see fig. 7) should turn on.

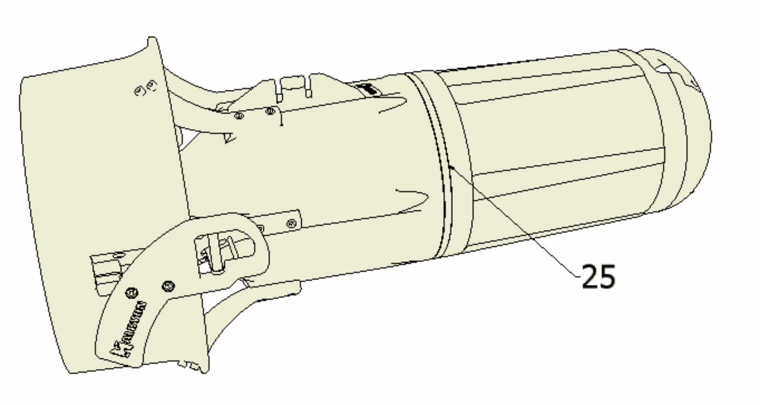


Figure 7

Grasp the two HDV handles (1) (fig. 1) or, if using the tow cord, hook the carabineer to the tow sling.
Press the trigger (2) until the engine starts.
To stop the engine, let go of the trigger (2).
To change propeller rpm, use the switch (8), rotating it to the positions described on the label (see fig. 8). A reference on the knob indicates the selection.
This latter operation can be conducted at any time, even underwater.
When finished use, turn the switch (6) (7) so that the blue led turns off (see fig.7).

IF YOU DO NOT USE THE TOW CORD, DO NOT DRIVE THE HDV SINGLE-HANDED. YOU MAY RISK LOSING CONTROL.



Figure 8

WARNING: when you press the trigger, the propeller starts to rotate and the HDV starts to move.

6 Red battery low warning led

A second red led is found next to the blue led (25) (see fig. 7).
When the red led, next to the blue one, turns on (the blue led stays on), this means that the battery is low. About 10/15 minutes of autonomy remain at this point depending on the temperature of use and battery wear conditions. At the end of this period, the HDV will stop due to the cut-off device.
When the red led turns on, it remains on for as long as the switch is in the on position. When the HDV is turned off, it may remain off the next time the HDV is turned on even if the battery was not charged and turn on when the trigger is pressed. The battery low indicator only works correctly when the HDV is running (propeller submerged and rotating).
Note: the sole purpose of the battery depleted signal is warn the diver that the battery is low. HALCYON is not liable for the failed operation or erroneous evaluation of residual battery charge which led to the incorrect assessment of HDV autonomy.
The system is based on battery voltage readings that cannot fully guarantee residual battery charge calculations. The indication highly depends on battery wear.

7 HDV diving settings

The HDV should have ***NEUTRAL*** buoyancy ***and be practically horizontal*** meaning it should not sink but remain stable at the desired depth. The vehicle is supplied neutrally buoyant or slightly float in fresh water. Additional weights (23), are provided to compensate for differences between use in fresh or salt water (see fig. 9) consisting in a stainless steel ballast that should be included or removed according to whether the HDV is used in fresh water (NOT USED) or seawater (USED).

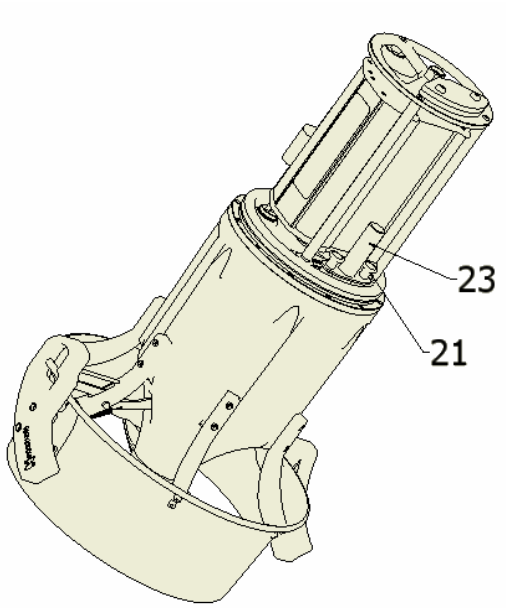


Figure 9

7.1 Inserting the ballast

Proceed as follows to insert the ballast (23): (see fig. 9)
Open the HDV and extract the battery (see previous chapters).
Insert the ballast in the specific housing being careful to screw in the two yellow ballast stop knobs (21) without forcing them.

IMPORTANT NOTE: Figure 9 illustrates the HDV in salt water settings, when using the HDV in fresh water, the ballast (23) should be removed from the HDV, the two knobs (21) may stay screwed into the HDV. This makes the HDV lighter and re-establishes the correct centre of gravity for the HDV to assume the right position underwater.

7.2 Settings and trim adjustments

You may need to adjust the float or trim settings (trim is the HDV longitudinal axis inclination).
As for floating, the HDV is produced to slightly float in both fresh water (without using the ballast 23) and salt water (using the ballast 23).
As for trim, you can change factory settings by moving the battery along the rods (13) fig.3. Remove the battery, rotate the screw (21) with a 5 mm Allen key, screwing in or out to adjust the battery position. Screwing it in, the HDV tends to position itself with the rear sinking, unscrewing it causes the opposite. Replace the battery connect the terminal (12) and the ring nut (11) try the HDV in the water until the desired settings are reached (see fig. 10).

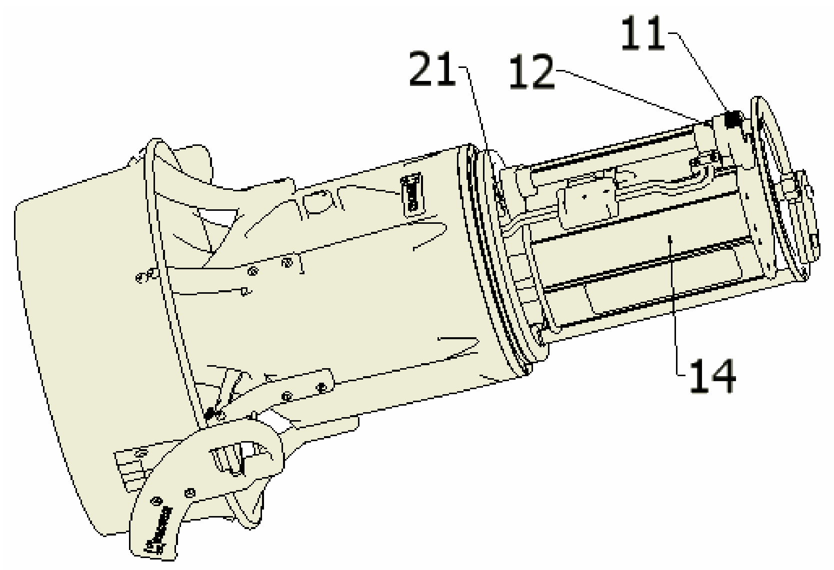


Figure 10

8 Safety instructions

8.1 Indicator label

The following indicator label is found on the vehicle. It should not be removed, tampered with or destroyed. The user of the vehicle shall be responsible for replacing any worn out or illegible label with a new one, it must be requested to our after-sales service.
HALCYON will not be liable for damages and accidents happened in consequence of behaviors in contradiction to the indications in it reported.

IMPORTANTE! NOTICE!

LEGGERE IL MANUALE DI ISTRUZIONI – READ THE INSTRUCTIONS MANUAL — ATTENZIONE ALL'ELICA – PAY ATTENTION TO THE PROPELLER
NON USARE LO SCOOTER PER AUMENTARE LA VELOCITA' DI RISALITA - DO NOT USE THE SCOOTER TO INCREASE THE ASCENT SPEED
RUOTARE L'INTERRUTTORE IN POSIZIONE OFF QUANDO LO SCOOTER NON E' UTILIZZATO - TURN THE SWITCH OFF WHEN THE SCOOTER IS NOT IN USE
RIMUOVERE LE BATTERIE DOPO L'USO - REMOVE THE BATTERIES AFTER THE USE
NON FUMARE O USARE FIAMME LIBERE DURANTE L'APERTURA - DO NOT SMOKE AND DO NOT USE OPEN FLAMES DURING THE OPENING PROCEDURE
PRIMA DI OGNI IMMERSIONE CONTROLLARE CHE I CONNETTORI ELETTRICI SIANO INSERITI, CONTROLLARE LE GUARNIZIONI DI TENUTA E ASSICURASI CHE LO SCOOTER SIA CHIUSO A FONDO
BEFORE EVERY DIVE CHECK THAT THE ELECTRICAL CONNECTORS ARE INSERITED PROPERLY,CHECK THE GASKETS ENSURE THAT THE SCOOTER IS CLOSED COMPLETELY.
LE BATTERIE VANNO RICARICATE IN LOCALI AERATI, NON DEVONO ESSERE RICARICATE ALL'INTERNO DI CONTENITORI ERMETICI, NON DEVONO ESSERE RICARICATE IN PARALLELO, SE PRESENTANO PERDITE DI LIQUIDO O RIGONFIAMENTI NON POSSONO ESSERE PIU' UTILIZZATE
BATTERIES MUST BE CHARGED IN WEL-VENTILATED ROOMS AND MUST NOT BE CHARGED INSIDE AIRTIGHT CONTAINERS. THEY MUST NOT BE CHARGED IN PARALLEL. DISPOSE OF LEAKY OR SWELLED BATTERIES
NON BAGNARE I CONTATTI ELETTRICI - DO NOT WET ELECTRICAL CONTACTS – NON USARE LO SCOOTER SE NON PERFETTAMENTE FUNZIONANTE - DO NOT USE THE SCOOTER IF IT IS NOT PERFECLY OPERTIONAL
NON RIMUOVERE QUESTA ETICHETTA - DO NOT REMOVE THIS LABEL – USARE SOLO IMMERSO – OPERATE IMMERSED ONLY

Use by children prohibited round sticker.
Rectangular sticker indicating the need to read the instruction manual.





8.2 Training

The HDV may be used by any diver but it is assumed that whoever is effecting the dive has obtained the necessary certification issued by qualified certification agencies. At any rate, **use of the HDV implies that the user has undergone specific training** that permits him to use the vehicle safely and to fully appreciate its potential. Do not forget that the greatest danger is constituted by the underwater environment being explored.

8.3 Equipment configuration and riding position

HALCYON diving vehicles are TOW BEHIND type (as opposed to the so-called "ride on top" kind) and thus ***ideal use*** requires the diver to be towed by behind the HDV.

READ CAREFULLY! The HDV should not be improperly bound to the diver. The user should be able to abandon the HDV at all times and with extreme ease. The HDV must be connected to the diver by a cord and quick-release carabineer. The diver should always carry a sharp knife on dives to manage emergency situations including that of cutting the cord and abandoning the vehicle.

Proper ways to connect the HDV to the diver.
The tow cord should be suitable dimensioned. Use of a 4 – 6 mm cord made of non-decaying synthetic material, in good working order and with at least 100 kg (220 lbf) haulage capacity is considered correct.
The carabineer must be made of rustproof material in good working conditions and equipped with an easy to grasp opening device. It must also be usable with gloves. The carabineer should be connected to the harness or "D" ring on technical balancing jackets.




Examples of the harness and carabineer to be used

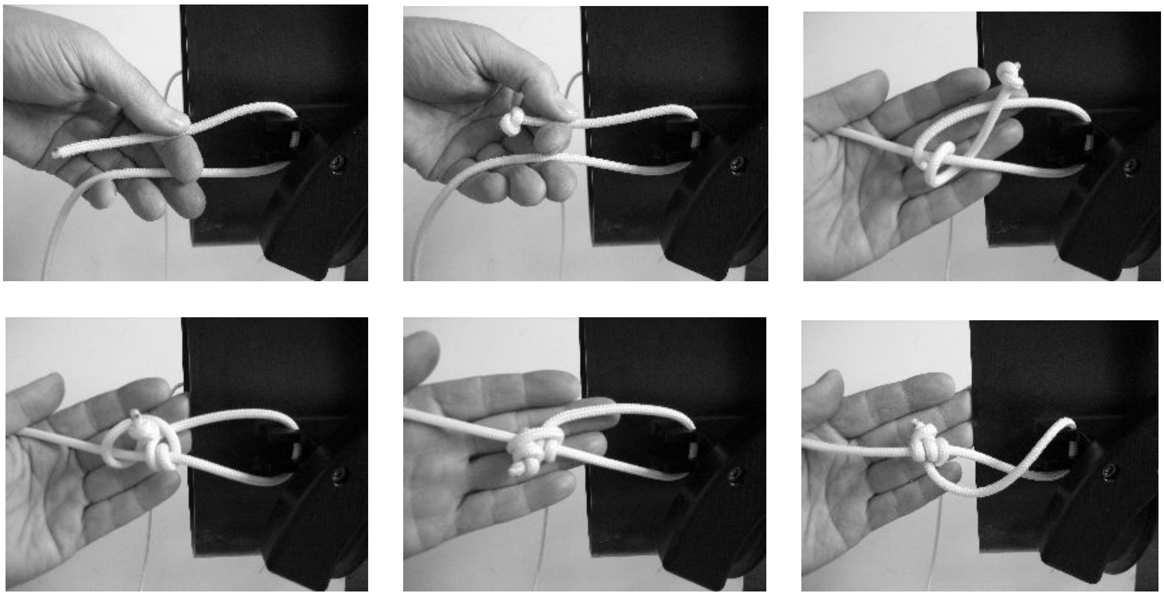
Improper ways to connect the HDV to the diver.
These include cords with knots, chains and elastic cords, to name a few, that do not allow the vehicle to be immediately abandoned in the event of emergency!

Correct way to connect the tow cord to the scooter.
The tow cord should be connected to the HDV through the two holes near the handle on the propeller conveyor. See the following illustrations.



Cord attachment to the left handle

Due to constant technological advancement, the manufacturer may modify the content of this manual without prior notice.



Attachment to the right handle, knot that allows for tow cord length adjustments.

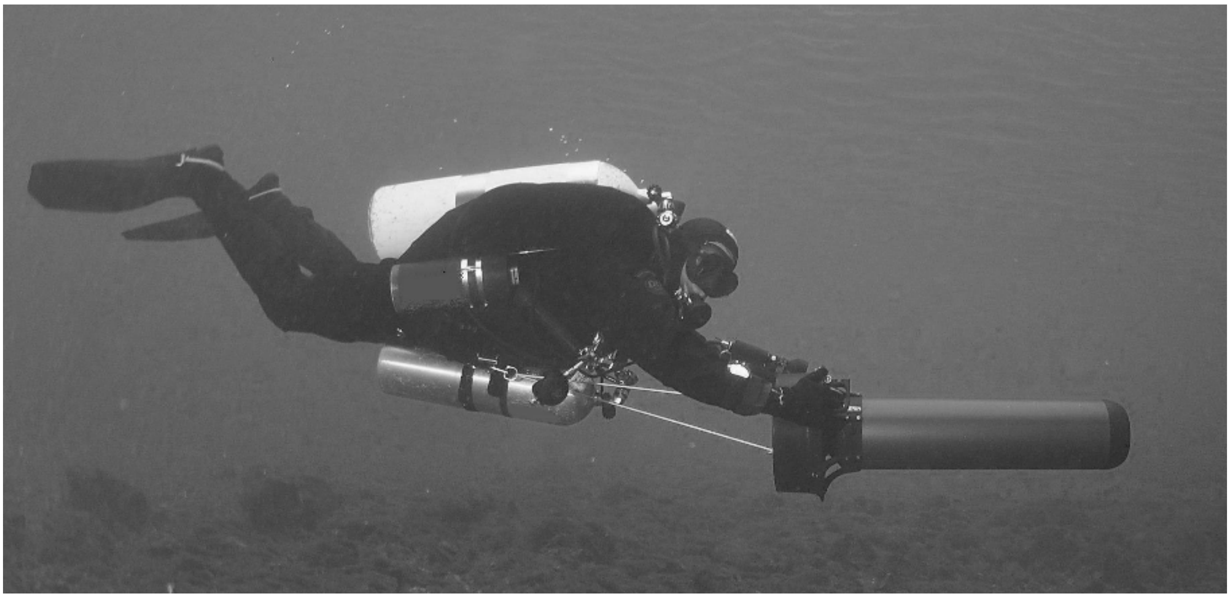


Figure 11

Diver position Fig. 11 illustrates a driver in technical configuration with the HDV correctly positioned. Other positions are admitted but considerably reduce drive efficiency. Tow cord length is extremely important for good towing efficiency. The right arm should remain slightly bent, drive the vehicle by pointing it in the direction to be followed but never hold the HDV which exerts all drive force on the tow cord.

If you prefer not to use the tow cord, both handles must be used. This type of use does not permit high speeds since resistance is higher with consequent arm fatigue.

The diver's position during the dive must be more or less horizontal (posture and buoyancy always derive from correct equipment configuration and adequate training). This ensures safety, longer running times, speed and riding comfort.

Be especially careful when setting out your equipment especially as regards: hoses, regulators, pony bottles, pressure gauges, audible alarms, flashlights and pertinent cables,



reels, etc., making sure they do not dangle and that they cannot come into contact with the propeller or entangle themselves on the bottom or on your buddy, creating
possibly serious hazard situations.

Correct equipment configuration is a crucial factor for safe diving in general and becomes vital when diving with the HDV. As a rule, the type and position of the diving equipment should guarantee perfect streamlining and no elements should protrude or be left dangling.

9 Using the HDV *diving vehicle*

Underwater diving is a potentially dangerous activity and incorrect use of the HDV further increases the hazards of the dive itself.
Before use, make sure the battery is charged, that connectors are connected and that no electrical parts are rusted. Check that the head cap is closed properly, check its condition, especially following accidental bumps, or accidental scratches, and make sure that the trigger and main switch are functioning correctly. At this point the HDV is ready for use. After entering the water, the main switch must be switched on by rotating it.



The main switch must be turned to running mode only when the HDV is in water. Rotating the propeller out of the water may be dangerous and damage the seal of the motor shaft.

Once in the water, the propeller is activated by pulling the trigger incorporated on the right manoeuvring handle towards you. Releasing the trigger will stop propeller rotation.
Speed can be regulated slow or fast, see the previous paragraph fig 7.

10 Entering the water with the HDV



Entering the water is one of the most delicate moments in the dive. Various factors like the change in temperature, use of a respirator, the weight of the equipment and other difficulties make the addition of the HDV an inevitable added burden.
Before turning on or using the HDV, make sure that all the equipment you use for the dive is correctly positioned and in good working order. Only use the HDV after completing these checks. Incorrect dive preparation is highly dangerous and, in some situations, the HDV may represent an additional hazard.
Pay particular attention when entering choppy water since waves could lift and launch the HDV against you with even fatal consequences.

11 Exiting the water with the HDV



Exiting the water is another delicate moment in the dive and, here too, the addition of the HDV could be an extra burden.
According to where you started the dive, always make sure the HDV is the last piece of equipment to recovery. Always put your safety first.
Pay particular attention when exiting choppy water since waves could lift and launch the HDV against you with even fatal consequences.

12 "Parking" the HDV underwater



When diving you may need to "park" the HDV to continue the dive with fins only, recovering the HDV later. We strongly recommend you leave the HDV far from areas with currents that could cause the HDV to collide with rock walls, the sea bottom or boats. Violent collisions could compromise the HDV's hermetic seal and irreparably damage it.
During decompression stops, be careful the HDV does not cause uncontrolled depth variations, turning it off and leaving it at your side.
DO NOT USE THE HDV TO MAINTAIN THE DECOMPRESSION OBBLIGATION!

13 Descent rate

The HDV allows you to accomplish a fast descent rate. **AVOID** using it to accelerate your descent since problems related to equalising and psychological/physical adjustment are increased.

14 Ascent rate



The HDV **MUST NEVER BE USED FOR VERTICAL ASCENTS.** In fact, using it in such a manner may result in an **excessively rapid ascent WHICH IS POTENTIALLY DANGEROUS.** Hence it is better to **DEACTIVATE IT BY TURNING THE MAIN SWITCH TO THE OFF POSITION,** position it out of the way**,** and ascend normally.

15 Using the HDV in apnoea



Diving in apnoea is highly dangerous in itself. The use of the HDV in apnoea could cause serious accidents. Always be certain and aware of your capabilities. Adequate training courses are essential for your safety.

16 Depth and operating environments

<u>DO NOT EXCEED THE MAXIMUM OPERATING DEPTH!!!</u>

The dive is already VERY DANGEROUS at that depth. **INCORRECT USE OF THE HDV IN SUCH ENVIRONMENTS INCREASE DIVING HAZARDS.**
It is important to remember that maximum diving vehicle operating depth refers to the HDV in prime conditions. Collisions, scratches or deformations significantly reduce this limit.

16.1 Obstructed environments

Dives in such environments are already **VERY DANGEROUS.**
INCORRECT USE OF THE HDV IN SUCH ENVIRONMENTS INCREASES THE DIVING HAZARDS. For example: if the control valves are hit accidentally whilst travelling at high speeds, these may break, with obvious consequences. **DIVING IN SUCH ENVIRONMENTS REQUIRES ADEQUATE TRAINING BY QUALIFIED AGENCIES.** It is hereby emphasized that the running time of both the HDV and the breathing gas must be planned in such a manner that every team member has TWICE the necessary resources available. It is also obligatory to carry another extra HDV.

16.2 Muddy or suspension-filled environments

These include those environments, obstructed or otherwise, in which visibility may suddenly fall to zero due to the suspension that is created by moving the bed sediment. Dives in these environments are already **VERY DANGEROUS. INCORRECT USE OF THE HDV IN SUCH ENVIRONMENTS INCREASES THE DIVING HAZARDS.**
DIVING IN SUCH ENVIRONMENTS REQUIRES ADEQUATE TRAINING BY QUALIFIED AGENCIES.
For example: the rotating propeller that faces downwards can lift a considerable amount of suspension.
Accidental activation of an emergency HDV in tow may create highly critical situations.

17 Positions and behaviours to be avoided when diving



The diver's head or other body parts should never be beyond the propeller conveyor (5) (see fig. 1) where flow is suctioned.
Do not direct the flow from the conveyor at you. This thwarts the propulsion drive and could move your equipment away from you.
Do not ride the HDV.
Do not attach the HDV to your tanks or their supports in any way.
Do not attach the HDV to your body, legs, arms or other parts in any way.
Do not use more than one HDV simultaneously.
Do not start the HDV with body parts other than your right hand.
When using the HDV, always keep your left hand far from the propeller, better is resting against your body, on your side, or on your right hand to more comfortably control the HDV.
Do not direct propeller flow at the sea bottom to avoid raising sand or mud.

18 Hazardous area and residual risks

The propeller is protected by an external radial circular band. Therefore it is exposed on both the suction and expulsion sides. Additional protections were not installed in these areas **since they would significantly reduce fluid passage in the conduit**, drastically reducing propulsion system performance. A protection grill on the flow suction side can be easily clogged when near aquatic plants or algae normally suspended in the water, forcing the diver to frequently stop to clean the grill which is not always possible in safety conditions underwater. A grill placed on the flow output side would prevent any cords or lines caught in the propeller to be removed, inhibiting HDV operations. This would frequently distract the diver and cause him to forget that the greater hazard is represented by the surrounding environment and diverting the his main focus away from the dive. For the above reasons and, considering that the propeller is protected by a safety clutch, we believe that the natural behaviour of being careful not to place hands or other body parts between propeller blades is safer for the diver (who in correct use, is always behind the propeller) than being distracted by cleaning and untangling any objects from the grills around the propeller.



Catching and cutting risk

Do not introduce any object or body part in the flow conveyor in contact with rotating propeller blades. Except for the hand on the trigger, keep at least 40 cm away from the propulsion group during use.

A CAP OR OTHER HAIR RESTRICTION DEVICE MUST BE WORN BY DIVERS WITH LONG HAIR. LONG HAIR MAY BECOME ENTANGLED IN THE PROPELLER IN THE EVENT OF IMPROPER USE.

ALSO BE CAREFUL OF ANY OBJECTS SUCH AS FISHING LINES, DIVING EQUIPMENT, FLOATING TOYS OR ANYTHING ELSE THAT MAY COME NEAR THE PROPELLER.

<u>PROTECTIVE GLOVES MUST ALWAYS BE WORN</u>



Crushing risk

When closing the tube or shell, be careful not to insert fingers between the two parts.



NEVER LEAVE THE HDV UNATTENDED ESPECIALLY NEAR CHILDREN OR AMATEURS. ALWAYS TURN IT OFF BEFORE EXITING THE WATER AND DISCONNECT THE BATTERY AS SOON AS POSSIBLE (see previous chapters).

18.1 Safety device

A torque-limiting device is installed between the motor and the propeller. When the resistance felt by the propeller exceeds a certain torque, this device intervenes, preventing the propeller from rotating.



The device will generate a rhythmic sound signalling its insertion. If this situation occurs, release the trigger immediately, <u>switch off the power by means of the main switch</u> and free the propeller of the foreign body.

Do not leave the torque-limiting device inserted for more than 10 seconds. It has been conceived for emergency purposes and may be damaged by prolonged use.

If conditions allow you to remove the foreign body safely during the dive, then do so. Otherwise let go of the HDV. Do not lubricate the safety device.

19 Electrical and mechanical safety systems applied to the HDV R 14

In order to insure maximum diver safety when using the HDV, various solutions were implemented to eliminate possible fault risks or potential injury.

19.1 Electronic engine control

The electronic engine control board includes:
A short circuit emergency fuse (on replaceable at authorized service centres)
Temperature sensor (slows propeller rotation to a stop. The system automatically restarts when the engine is cool).
Maximum absorbed current sensor (maximum current that can be absorbed by the electrical engine, fully automatic, to protect electronic parts)
Cut off (in addition to the one in the battery, even the electronic control automatically turns off if powered with voltage under that prescribed).
Engine ignition sensor without mechanical contacts (the sensor is not a reed or mechanical type but inductive)

19.2 Electronic battery control

The battery includes:
An emergency thermostat (if a battery charger fault occurs that overload the battery when charging, the thermostat prevents battery overheating by cutting off the charge)
Cut off (in the event of depletion, it eliminates electric absorption cutting off the power supply. It is restored when the battery is charged)

19.3 Switch

This HDV comes with a switch that cuts off the battery from the electronic engine control. Using the switch limits accidental ignition which may not occur in any case if the switch is in the OFF position.

19.4 Mechanical clutch on the propeller

See chapter 18.1

19.5 Trigger guard

The trigger is isolated by a guard that forces the diver to insert a finger in the ignition area to press the trigger and start the HDV.

20 Running time

Running time data is indicative and is nevertheless referred to use:
- with a vehicle in perfect running order
- in moderate environments
- in the absence of currents
- with an average load (diver with a double tank 12+12 litters)
- in perfect buoyancy conditions

As a rule, the running time should be calculated to cover the descent and ascent. An ***EMERGENCY*** running time, which will vary according to the type of dive, must also be established.
In any case, when planning a dive you MUST consider the event of returning to the exit point without the HDV.

21 Speed

Speed depends on the same factors as running time. The speed chosen should be compatible with the type of dive and be adjusted to match that of your buddies.

22 Precautions for use

- **Do not expose the HDV to solar radiations, closed into the car under the sun, or exposed to excessive heat (max 50℃ (122℉)). Overh eating and successive deformation may occur, to the prejudice of the water tightness of mating surfaces.**

- Avoid bumps during the dive
- Do not direct the HDV toward other divers.
- Do not use it as a stool
- Do not stand up on it
- Do not have it used by children or untrained people.
- Do not transport it dismantled or open.
- Do not attempt to stop the propeller with your hands.
- Do not block the starter trigger when the switch is turned to on.
- Do not throw it off a boat or the shore.
- Do not tow it with motor boats.
- Do not dismantle it.
- Do not run it dry above water.
- Do not wet electrical contacts.
- Do not short-circuit the battery
- Do not charge the batteries with a battery charger other than the one supplied.
- Do not start the HDV when holding the propeller or with objects between the blades.
- Do not remove wires from the connector or invert polarity.
- Do not get internal HDV parts and batteries wet.

23 Troubleshooting

PROBLEM	POSSIBLE CAUSE - TREATMENT
The HDV does not run. When the trigger is activated the propeller does not turn.	Open the HDV, check that the batteries are charged and that the connectors are inserted and undamaged, then try again.
Although the battery pack has been charged and the connectors are inserted the HDV does not run.	The control system may be damaged - must be checked.* The motor may be damaged - must be replaced.* The battery pack may be damaged - must be replaced.
The speed regulator doesn’t work.	The control system may be damaged - must be replaced.*
The HDV’s running time is visibly diminished.	The batteries need to be replaced. The battery charger is broken or does not work well - must be replaced.
When the main switch is on, the HDV runs continuously with no chance of stopping it.	The control card is damaged - must be replaced.*
The motor is noisy.	The HDV needs to be serviced.*
Vibrations are felt when the propeller rotates.	The propeller is damaged - must be replaced. The drive system is damaged - needs to be serviced.*
The HDV floods very slowly.	Replace all the O-rings and carefully check that the seating surfaces are not damaged.
The control trigger sticks and the HDV remains running.	Shut off the HDV, try to slide the starting piston, driven by the trigger, to get out any foreign bodies, try to start again. If the HDV continues to work, the starting system must be verified, probably it was damaged by a shock.
There are oil stains on the conic end of the case near the propeller or it is visibly greasy.	The external propeller shaft seal is damaged and requires maintenance. The second internal seal prevents flooding but you should suspend HDV use and replace the gaskets.

*operations to be carried out by HALCYON authorised service centres.

24 HDV flooding, sinking



This could occur especially due to improper use, a collision, incorrect closing or inefficient maintenance.
In the event of flooding, the scooter will start to tilt downward and thus sink.
In the event of ***total*** flooding, the situation could become ***POTENTIALLY HAZARDOUS since the HDV will start to SINK, DRAGGING YOU DOWN*** and therefore the vehicle ***MUST BE IMMEDIATELY ABANDONED*****.**

25 Cleaning and storage

After use, the HDV must be rinsed thoroughly with fresh water. A neutral detergent may be used for more stubborn dirt. Before opening the HDV, it is important to remove all traces of salt. In particular, the proximity connected to the trigger must be cleaned thoroughly and all grit and sand particles removed.



Do not use any solvents or petroleum-based products.
The HDV must be stored in a cool, clean, and ventilated place, in an upright position with the nose facing upwards. The battery must be

removed, charged and stored away from frosty conditions or excessive heat. Make sure that the connectors do not come into contact with metal objects inside the HDV or the battery will be shorted. The wheel for opening the head cap must be loosened such that the gasket is in view.

Important note: always remove the battery after the use.

26 Maintenance

OR seal maintenance
Open the HDV, gently remove the lock O-ring (19) (see fig. 5) being careful not to scratch the O-ring support surfaces, and clean the seating thoroughly (only by means of a clean brush or soft cloth). Do not use any type of solvent or alcohol. Apply silicone oil to the O-ring and return it to its place. Do not use any other type of oil!!! We recommend the aerosol spray type which is usually used for diving equipment. Occasionally, lubricate the lock knob screw with normal mineral grease. Never lubricate trigger or magnetic piston movement. They would fill of sand and dirt. Do not lubricate electrical contacts!

Closing knob gasket maintenance
Whenever the closing knob (9) (see fig. 1) comes into contact with sand, rinse with running water before rotating it. About every 50 uses, remove it, using pliers, clean the gaskets and lubricate with marine grease, If you are not familiar with this operation, contact an authorized service centre.

Supplementary maintenance
Every hundred hours of use or at least every two years, we recommend you overhaul the HDV checking hydraulic seals and electrical circuits.

HALCYON fully overhauls your HDV with shipping throughout the world.



NOTE: using spray lubricants, it is important to air the inside of the HDV. In this way the propelling gas go away, for the most part are inflammable!

27 Disposal and scrapping

This apparatus is partly constructed with recyclable materials.
When the HDV can no longer be used safely or when the service centre deems it no longer suitable for use, the HDV must be scrapped.
The HDV must be disassembled and divided into distinct parts. Plastic parts must be deposited in the relative plastic waste containers and metal parts must be taken to a collection centre for metal waste.



Special care must be taken when disposing of battery packs, which are highly polluting to the environment. Batteries must be taken to a collection centre for spent batteries.



PLEASE SAFEGUARD YOUR SURROUNDINGS!! ALL VEHICLE PARTS AND THE BATTERY PACKS IN PARTICULAR SHOULD BE DISPOSED OF ACCORDING TO LOCAL DISPOSAL REGULATIONS!

28 Handling

WARNING! The HDV weight is 17 Kg – 37,5 lb

<u>In every transport condition, the HDV must be always closed.</u>

The vehicle has been conceived for use in water environments. When transporting it or loading it onto a car, some precautions need to be taken due to its shape and weight.
Lift it holding a flow conduit support and front handle.
Whilst transporting it by car or by boat, make sure it is blocked in a secure position. If not blocked it could easy roll and cause damages to property and personal injury.
The use of the support cod. _____ is advised (see Halcyon accessories).
Do not position the HDV at the front of boats or dinghies or in positions where it would be subjected to harsh jolting the inner parts may be damaged. When the HDV is laid on the ground, always do so gently, and when it is placed in the upright position, rest it on the propeller guard. Always make sure that the surface is flat and that nothing comes into contact with the propeller.
If you prefer to grip the HDV from the maneuvering handles, do so, but do not overstress them - they were not designed to bear excessive loads. Do not carry the entire weight of the HDV on only one handle.
BEFORE EMBARKING THE HDV ON AIRPLANES OR PUBLIC TRANSPORTATION VEHICLES, PLEASE READ THE REGULATIONS ON BATTERY TRANSPORT!

29 Storage

If you do not plan to use the HDV for long periods of time (over two months) please follow the instructions below for correct storage.

- Carefully rinse the HDV with fresh water and wash with a neutral detergent if necessary
- Fully dry the HDV
- Open the HDV and remove the battery
- Remove the body gasket OR
- Accurately clean the OR and its housing
- Insert the OR in the body (to avoid losing it)
- Close the HDV without tightening the knob
- Place the HDV in a dry, dark place away from children
- Place the battery in a dry place at a temperature between 10°(50°F) and 30° C(86°F)
- Charge the battery at least every 2 months

When you resume HDV use, follow the instruction in chapter “Preliminary operations”
Note: remember to replace the body OR adequately lubricated with silicon oil before use.

30 Technical specifications

Size: Length x breadth x height	Mm - in	660x420x338 - 26x16,5x13,3
Weight:	Kg - lb	17 – 37,5
Speed:	m/min - kn	from 20 to 55* - from 0,66 to 1,8*
Running time	min.	from 60 to 100*
Voltage	V.DC	24
Max. charging time	h	8
Max. depth	m	100
Max. static traction +/- 10%	daN - lbf	18 - 80

Data is only exemplary since constant product developments could cause variations without prior notice.
* depends on the towed diver, the type of use and configuration

31 Spare parts

The following table lists the main spare parts and accessories. Any other part is available upon request. Contact your local Halcyon dealer or visit www.halcyon.net for availability and pricing:

HDV support
Automatic burn tester
Tow harness
Safety clip
Shaft seal or kit
HDV-R 14 complete gasket kit
Complete shaft seal kit
HDV-R 14 battery pack
CB 2500/20 NiMH battery charger
HDV-R 14 ballast

32 Product identification

The machine has been marked with a hot-pressed serial number generally located in the body, on the battery and engine body. This number is to be quoted whenever technical assistance or spare parts are required.

Check plate data and EC marking completeness on the HDV.



33 Battery charge (general rules)

- **CAREFULLY READ THE BATTERY CHARGER INSTRUCTIONS MANUAL.**
- **The battery should only be charged with the specifically supplied battery charger.**
- **Charge the battery in a well-ventilated, covered area, away from flammable objects or liquids, away from crowded rooms and in no way in the home.**
- **The battery must be connected to the charger using the specific connector.**
- **REMOVE THE BATTERY from the HDV and wait at least two hours from the last use before charging.**
- **Do not connect any device to the battery when charging.**
- **The battery should be kept off the HDV and only inserted and connected to the engine immediately before use: it should be disconnected and removed immediately after use**

34 How to correctly charge the battery

- Remove the battery from the HDV.
- Place it in a protected, well-ventilated area away from people and flammable materials.
- **FIRST** connect the battery charger to the battery charge connector (varies according to the model) on the battery.
- **NEXT** connect the battery charger to the mains.
- Wait until fully charged (see battery charger instructions)
- Wait until the battery cools. In any case, replace the battery in the HDV before use.



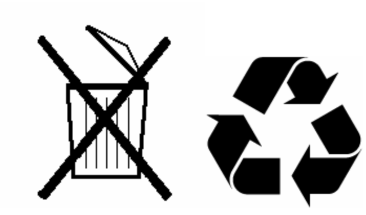
DO NOT ATTEMPT TO CHARGE DAMAGED, LEAKING, RUSTED OR OTHERWISE DAMAGED BATTERIES.
HALCYON IS AVAILABLE FOR ANY NECESSARY TECHNICAL ASSISTANCE.

35 NiMH battery information

The NiMH battery is made up of 20 1.2 volt cells, connected in sequence, assembled on a plastic support and wired with two connectors, a three colours one for the charger (24) (see fig. 10), and a red one for connection to the HDV engine.
If a perceptible drop in distributed power is noticed during HDV use, immediately stop use and turn off using the switch.
NEVER leave the battery connected to the HDV when not in use.
Charge the battery at least once a month.
Charge the battery before each use, letting the battery cool before inserting it in the HDV; during this phase the battery could release hydrogen which would inevitably accumulate inside the HDV which is air tight.
Hydrogen accumulation (in special conditions) could cause accidents, with consequent damages to people and property.
A new battery will only work at full regime after four or five complete charge cycles.
The battery may be charged hundreds of times, but deteriorates in time. When autonomy is significantly lower than normal, it is time to replace it.
Only use Halcyon srl approved batteries, exclusively charging them with their approved battery chargers. When the battery charger is not in use, disconnect it from the power socket.
Even when not in use, a fully charged battery slowly dies due to the self-discharge phenomenon; charging the batteries within 24 hours of use is recommended.
Extreme temperatures may affect battery charge capacity.
Leaving the battery in hot or cold climates such as, for example, a closed car in mid-summer or mid-winter, reduces battery capacity and life. Always try to keep batteries at a temperature between 15℃ (59℉) a nd 25℃ (77℉). Battery performance is significantly reduced at temperatures lower than 0℃ (32℉).



DO NOT THROW BATTERIES IN FIRES, THEY EXPLODE!
Do not use the battery for purposes other than those prescribed.
Never use damaged battery chargers or batteries.
Accumulators must be kept outside the HDV, in dry locations, (relative humidity 65% +-5%) and at a temperature between 15℃ (59℉) and 25 ℃ (77℉), with the electric connectors away from metallic objects that can short circuit the two battery poles, with serious fire hazard, damages to people and property.
Do not wet electrical contacts or the battery.
Dispose of batteries observing local regulations such as, for example, recycling them. Do not dispose of batteries with domestic waste.



Nickel Metal Hydride (NiMH)

36 Ideal battery charging conditions

Admitted room temperature from 10℃ (50℉) to 35℃ (95℉)(ideal 20℃ (68℉))
Battery temperature at charge start 20℃ (68℉).
Conditions other than those described above may influence charging as well as the number of possible charges with acceptable yield.

37 Ideal battery depletion conditions

We recommend using batteries at a room temperature between 5℃ (41℉) and 35℃(95℉).
To avoid short term deterioration and potential cell polarity inversion, the battery **must not, in any case, be fully depleted**. The automatic cut off device that prevents full battery depletion was installed for this reason (see specific paragraph).
During HDV use, it is best not to constantly drive at maximum speed but to use the rpm regulator, suspending frequent starts, making brief pauses, to give the battery time to better conduct the chemical reaction required to generate power, avoiding abrupt cell heating.

37.1 Important note on battery depletion!

After HDV use, always remember to cut off motor power using the switch.
This is because the HDV electronic control, even if the motor is not running, consumes a small amount of energy which, in the long term, depletes the battery. The cut off device prevents the battery from overheating, but if, for any reason, it malfunctions, the battery would die and the polarity of some cells may invert.

38 “CUT OFF” battery protection system, operating principle and instructions for use

The electronic battery protection system from total accidental depletion is located inside the battery and connected in sequence between the battery and HDV engine.
Its purpose is to prevent excessive cell depletion that could lead to the polarity inversion of one or more cells, with consequent potential battery destruction and possible damages, even serious, to property and/or people.
When accumulators deplete, voltage lowers until it reaches a limit value. When this value is reached, cut off prevents the battery from further depleting by interrupting power distribution.
When the cut off is triggered, the battery no longer outputs voltage to the connector.

To continue battery use, it must only be charged with the specific battery charger (see battery charger instruction manual) and restore the circuit.
The cut off device should only trigger in exceptional cases and this event should not occur during normal battery use since correct use does not include excessive depletion.
In case of short circuit of the battery the cut off system will be completely damaged with subsequently high risk of fire.

38.1 Procedure to follow in the event the cut off device is triggered

In the event the cut off system triggers, IT IS IMPORTANT you proceed as follows:

1. Follow the HDV opening procedure.
1. Disconnect the engine battery power connector.
2. Remove the battery from the HDV.
3. Let the battery rest for at least 2 hours. This is the minimum time required, in this case, for the battery to cool and return to awaiting charge conditions.
4. Connect the battery charge connector to the battery charger.
5. Charge following the instructions in the battery charger manual.



IMPORTANT NOTE!
Also remember that the HDV inevitably stops running when the cut off device is triggered. This event is not hazardous to the diver in any way since the dive was planned taking into account that HDV use is not considered a safety device or rescue means.
HALCYON is not liable after the cut off system triggers, in any situation, in hazardous situations or immersions where the driver (at his full risk) confided on surfacing by using our manufactured under water vehicle.
Please remember that the HDV must be considered as an immersion aid and not as a rescue vehicle.

39 NiMH battery, frequently asked questions:

I often use the HDV, twice a week or every day, but I never fully deplete the battery since I make short dives. Should I remove the battery after every use and charge it?
The battery should be disconnected and removed after every use, if possible, charge when the charge level is almost depleted, otherwise, charge after every use.
The battery should be kept off the HDV and inserted and connected to the engine only immediately prior to use. It should be disconnected and removed immediately after use.
Can I leave the battery connected to the battery charger for a long period of time?
After charging, our battery chargers enter idle mode and can be left attached to the battery as long as you like. They only charge if necessary. However, it is always best to disconnect them as soon as charging is finished.
I dropped the battery. One of the cells is dented. Can I still use it?
NiMh cells are extremely delicate. NEVER use a battery that has fallen on the ground since some connections could be damaged. Send the battery to customer service who will check damages and repair the battery if necessary.
Is battery heating normal when charging?
Given that a battery should always be charged at room temperature between 15℃ (59℉) and 25℃ (77℉), the battery's temperature may rise during charge.
Is battery heating normal when outputting?

As with charging, battery output slightly raises battery temperature, therefore, the same conditions apply as above.

How long does good NiMh battery efficiency last if not used?

This depends on many factors, especially on the battery's "life". Usually a battery charged at least once a month and never fully depleted can last up to five years.

When the battery is dead, what should I do with it?

The battery should be disposed of in a specific depleted battery recycling center. There are specific collection centers in every city.

I left the battery on the boat and sea elements rusted the silver-plated connector contacts. What should I do?

All electrical contacts inside the HDV battery case should never generate electrical shocks or sparks due to the presence of hydrogen.

The connector should be immediately replaced (see Halcyon customer service).

I pulled the battery wires by mistake and damaged the insulation. Do I have to replace them or can I insulate them with tape?

A wiring short circuit could even make the battery explode creating serious hazards to people and property (see Halcyon customer service).

When I have to charge the battery, can I leave the red connector attached to the HDV engine?

No! Although turning off the HDV using the circuit breaker knob (see instruction manual) prevents engine power absorption, the battery must be detached and charged off the scooter in all cases.

I noticed the battery leaks liquid, can I still use the battery?

No! Do not use the battery. It is hazardous to people and property!

I noticed some bumps on the battery, can I still use it?

No! Do not use the battery. It is hazardous to people and property!

How can I tell what the battery efficiency is? If I have to plan a dive, how can I be sure that the battery charge provides a certain autonomy?

For this reason, there is a tool that simulates electrical scooter absorption during operations and depletes the battery to a 20 volt residual voltage. When finished, the length of output in minutes is displayed. This data gives you an idea on battery "health" letting you plan correct use. (see "burn tester" accessories).

40 Warranty

Each HDV is factory tested underwater and only marketed when all necessary tests are passed, including waterproof tests.

In the event of flooding (meaning the liquid in which the HDV was submerged enters the watertight case) warranty validity is at the discretion of HALCYON

Transport and packaging fees to or from the HALCYON offices from non EU countries shall be born by the purchaser.

The product (excluding the battery) is covered against all manufacturing defects for a period of two years from the date of purchase proven by a sales document, excluding:

- non-conform use or use other than that foreseen or illustrated in this manual
- negligence, attempts to repair or modify the HDV by personnel not expressly authorized by HALCYON that jeopardize correct operations or prevent adequate checks and tests to meet repair needs under the warranty
- temporarily rented products
- Scratches or damages to any surface, due to normal product use by the consumer.

- normal wear or deterioration
- damages due to transport, falls or accidents

The batteries supplied with our ADC are guaranteed for a period of 3 months excluding:

- Defects due to damages, incorrect use, accident, tampering, negligence or neglect and in the event of modifications or repairs made by unauthorized personnel that jeopardize correct operations or prevent adequate checks and tests to meet repair needs under the warranty
- Defects or damages due to product use in conditions other than those described in this manual
- Defects or damages due to incorrect controls, operations, maintenance, installation, adjustments, unauthorized applications or any other alteration or modification of any form.
- Broken or damaged wires or connections unless directly due to material or factory defects.
- Defects or damages due to humidity, liquids or foreign objects introduced within the battery pack or that have rusted any part of the battery.

41 RoHS and WEEE conformity

With reference to regulation RoHS (Restriction of Hazardous Substances) HALCYON declares that all products introduced on the European market meet the following European regulations, assimilated in Italy by legislative decree nr. 151 dated 25/07/2005:
1) European Directive 2002/95/ED dated January 27, 2003, on the restriction to use the following hazardous substances in electric and electronic equipment, and thus the items do not contain concentrations that exceed the acceptable limits for the following substances:

- Lead
- Hexavalent Chromium (Cr+6)
- Mercury (Hg)
- Polybrominated biphenyl (PBB)
- Cadmium (Cd)
- Polybrominated diphenyl ethers (PBDE)

2) European Directive 2002/96/EC dated January 27, 2003, or WEEE (Waste electrical and electronic equipment) that sets specific criteria for the collection, handling and recycling of electrical and electronic waste. All products that meet this regulation are marked with the following logo:

42 Noise levels

Continuous A-weighted equivalent noise pressure levels do not exceed 70 dB (A).
C-weighted peak noise pressure values do not exceed 63 Pa (130 dB regarding 20 microPa).

43 Vibration levels

The average weighted square root of acceleration transmitted to the hand-arm system does not exceed 2,5 m/s^2.

44 After-sales service

The company's after-sales service is at your disposal at all times. Any requests may be addressed to:

HALCYON Manufacturing
1110 S. Main St.
High Springs, FL 32463
United States
US/International Phone: 386.454.0811
US Phone: 800.HALCYON
FAX: 386.454.0815

Contact Email: info@halcyon.net

www.halcyon.net

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45 CE conformity

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DECLARATION OF CE CONFORMITY

HALCYON Manufacturing
1110 S. Main St. High Springs, FL 32463 - United States
Declare, under our sole responsibility as
Distributor, that the product :

Underwater scooter **HDV R 14**

Complies with regulations :

Machinery Directive 2006/95/CE
Electromagnetic Compatibility EMC 2004/108/CE

and declares that the following rules are applied :

UNI EN ISO 14151-1:2007
UNI EN ISO 12100-1:2009
UNI EN ISO 61000-6-4
UNI EN ISO 61000-6-1
CEI EN 60034-1
CEI EN 60335-1

Sole Director

Name and Surname

High Springs, May 2nd, 2010

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